



# OSHPD Technical Note for Producing Ischemic Stroke: Hospital Outcomes in California, 2014-2015

**Office of Statewide Health Planning and Development  
May 2017**



## **Acknowledgements:**

This OSHPD Implementation of The California Report on Ischemic Stroke 2014-2015, Technical Note was produced by the following Information Services Division staff:

Christopher Krawczyk, Ph.D.  
Manager, Healthcare Analytics Branch

Merry Holliday-Hanson, Ph.D.  
Manager, Administrative Data Program

Limin Wang, Ph.D.  
Research Scientist, Administrative Data Program

Edmund G. Brown Jr., Governor  
State of California

Diana S. Dooley, Secretary  
Health and Human Services Agency

Robert P. David, Director  
Office of Statewide Health Planning and Development

## Table of Contents

<b>DATA SOURCES .....</b>	<b>1</b>
<b>SELECTION OF HOSPITALS.....</b>	<b>1</b>
Table 1. Hospitals with Fewer than 30 Stroke Admissions, 2014-2015 .....	1
<b>SELECTION OF PATIENTS .....</b>	<b>4</b>
Table 2. Ischemic Stroke Diagnoses Included in the Analysis .....	5
<b>OUTCOME MEASURES.....</b>	<b>5</b>
<b>HOW THE OUTCOMES WERE MEASURED .....</b>	<b>6</b>
<b>PATIENT DEMOGRAPHIC AND HOSPITALIZATION CHARACTERISTICS.....</b>	<b>7</b>
Table 3. Demographic Characteristics of Ischemic Stroke Patients .....	8
<b>RISK-ADJUSTMENT MODELS .....</b>	<b>8</b>
Table 4. Parameters for 30-Day Mortality Model .....	9
Table 5. Parameters for Readmission Model .....	13
<b>RISK MODEL PERFORMANCE .....</b>	<b>15</b>
Table 6. Calibration of Risk Model for 30-Day Mortality, 2014-2015 .....	16
Table 7. Calibration of Risk Model for 30-Day Readmission, 2014-2015 .....	16
<b>CALCULATION OF HOSPITAL OUTCOME MEASURES .....</b>	<b>17</b>
<b>LIMITATIONS OF THE DATA AND MODELS .....</b>	<b>17</b>
<b>OTHER STROKE QUALITY MEASURES .....</b>	<b>18</b>
<b>AHRQ INPATIENT STROKE MORTALITY MEASURE.....</b>	<b>18</b>
<b>CMS STROKE MORTALITY AND READMISSION MEASURES .....</b>	<b>19</b>
<b>RESULTS: RISK-ADJUSTED OUTCOMES.....</b>	<b>19</b>
Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015 .....	22
Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015.....	48

The stroke mortality risk model used in this report was developed through a multi-step process that included conducting a literature review, convening an expert panel, selecting candidate outcome measures, defining the study cohort, selecting risk factors for the risk model, estimating and testing statistical models, and calculating outcome measures. The details of this process are described in the report “Ischemic Stroke Outcomes Validation Study in California, 2006-2009,” which is available on the Office of Statewide Health Planning and Development (OSHPD) website: <http://www.oshpd.ca.gov>. In this technical note, OSHPD summarizes the key information regarding data sources, selection of hospitals and patients, the mortality measure and risk factors, the readmission measure and risk factors, patient demographic characteristics, risk model performance, and limitations of the methods.

## Data Sources

The primary data source for this report was the California Patient Discharge Data (PDD) collected by OSHPD. For this report, stroke patients were selected from January 1, 2014 through September 30, 2015 PDD files. To identify deaths that occurred after discharge, the PDD was matched to 2014 and 2015 California death certificate records (Death Statistical Master File) obtained from the California Department of Public Health, using patients’ Social Security number as the common identifier in both datasets.

## Selection of Hospitals

A total of 324 acute care hospitals reporting patient discharge data to OSHPD were eligible for inclusion. In cases of hospital consolidation, name change, and change of address, the discharges were attributed to the name of the hospital that was in effect at the time services were provided. Fifty-seven hospitals were excluded from performance reporting because they treated a small number of ischemic stroke cases. Low-volume hospitals were excluded because their risk-adjusted rates are inherently unreliable, and the purpose of the report was to evaluate differences in diagnosis, severity of illness, and treatment across hospital strata defined by risk-adjusted rates. OSHPD used 30 cases as a cutoff for exclusion. Table 1 shows these hospitals with fewer than 30 ischemic stroke admissions from January 1, 2014 to September 30, 2015. A total of 685 ischemic stroke patients were reported from excluded hospitals during the time period, with 78 deaths and 58 readmissions. The small number of cases resulted in risk-adjusted rates with extremely wide confidence intervals that could not be meaningfully interpreted; therefore, risk-adjusted outcome rates and performance ratings are not provided for these hospitals.

**Table 1. Hospitals with Fewer than 30 Stroke Admissions during 2014-2015**

County	Hospital	Number of Stroke Cases	Number of Deaths	Number of Readmissions
Butte	Orchard Hospital	8	0	1
Colusa	Colusa Regional Medical Center	13	1	1
El Dorado	Barton Memorial Hospital	20	1	1

**Table 1. Hospitals with Fewer than 30 Stroke Admissions during 2014-2015**

<b>County</b>	<b>Hospital</b>	<b>Number of Stroke Cases</b>	<b>Number of Deaths</b>	<b>Number of Readmissions</b>
Fresno	Coalinga Regional Medical Center	5	1	0
Fresno	Fresno Heart and Surgical Hospital	3	0	0
Glenn	Glenn Medical Center	2	0	0
Humboldt	Redwood Memorial Hospital	29	7	2
Inyo	Northern Inyo Hospital	21	2	1
Inyo	Southern Inyo Hospital	1	0	0
Kern	Delano Regional Medical Center	19	4	2
Kern	Kern Valley Healthcare District	12	3	0
Kern	Tehachapi Hospital	1	0	0
Lake	Saint Helena Hospital – Clearlake	9	2	1
Lassen	Banner Lassen Medical Center	6	2	0
Los Angeles	East Los Angeles Doctors Hospital	21	3	4
Los Angeles	Encino Hospital Medical Center	27	2	4
Los Angeles	Gardens Regional Hospital and Medical Center	20	0	2
Los Angeles	Glendora Community Hospital	16	1	3
Los Angeles	Greater El Monte Community Hospital	27	1	2
Los Angeles	Hollywood Community Hospital	6	0	1
Los Angeles	Keck Hospital of University of Southern California	27	2	4
Los Angeles	Los Angeles Community Hospital	15	1	2

**Table 1. Hospitals with Fewer than 30 Stroke Admissions during 2014-2015**

<b>County</b>	<b>Hospital</b>	<b>Number of Stroke Cases</b>	<b>Number of Deaths</b>	<b>Number of Readmissions</b>
Los Angeles	Martin Luther King Jr. – Harbor Hospital	1	0	0
Los Angeles	Motion Picture and Television Hospital	1	0	0
Los Angeles	Norwalk Community Hospital	23	0	1
Los Angeles	Pacifica Hospital of the Valley	29	2	4
Los Angeles	Silver Lake Medical Center – Downtown Campus	13	1	2
Los Angeles	Temple Community Hospital	14	1	0
Mariposa	John C. Fremont Healthcare District	4	1	1
Merced	Memorial Hospital Los Banos	7	0	0
Modoc	Modoc Medical Center	2	0	0
Mono	Mammoth Hospital	2	0	0
Monterey	George L. Mee Memorial Hospital	3	1	0
Nevada	Tahoe Forest Hospital	10	0	0
Orange	Anaheim Global Medical Center	18	0	1
Orange	Chapman Medical Center	17	1	2
Orange	Mission Hospital Laguna Beach	3	1	0
Orange	South Coast Global Medical Center	17	0	0
Plumas	Eastern Plumas Hospital – Portola Campus	3	2	0
Plumas	Plumas District Hospital	3	0	0
Plumas	Seneca Healthcare District	2	0	0

**Table 1. Hospitals with Fewer than 30 Stroke Admissions during 2014-2015**

County	Hospital	Number of Stroke Cases	Number of Deaths	Number of Readmissions
Riverside	Palo Verde Hospital	12	1	3
San Bernardino	Bear Valley Community Hospital	1	0	0
San Bernardino	Colorado River Medical Center	4	0	1
San Bernardino	Hi-Desert Medical Center	29	3	2
San Bernardino	Montclair Hospital Medical Center	19	2	1
San Bernardino	Mountains Community Hospital	1	0	0
San Diego	Fallbrook Hospital District	3	0	0
Santa Barbara	Goleta Valley Cottage Hospital	3	1	0
Santa Barbara	Santa Ynez Valley Cottage Hospital	9	2	0
Shasta	Mayers Memorial Hospital	4	2	0
Siskiyou	Mercy Medical Center Mt. Shasta	25	11	3
Sonoma	Healdsburg District Hospital	28	2	2
Sonoma	Palm Drive Hospital	6	1	0
Stanislaus	Oak Valley District Hospital	28	2	0
Trinity	Trinity Hospital	5	4	0
Tulare	Tulare Regional Medical Center	28	4	4

### Selection of Patients

Patients were selected for this analysis if these inclusion and exclusion criteria were met:

#### Inclusion Criteria

- Admission date between January 1, 2014 and September 30, 2015
- Age at admission of 18 years and older
- Principal ICD-9-CM diagnosis code for ischemic stroke (Table 2)



**Table 2. Ischemic Stroke Diagnoses Included in the Analysis**

ICD-9-CM Code	ICD-9-CM Description
433.01	Occlusion and stenosis of basilar artery with cerebral infarction
433.11	Occlusion and stenosis of carotid artery with cerebral infarction
433.21	Occlusion and stenosis of vertebral artery with cerebral infarction
433.31	Occlusion and stenosis of multiple and bilateral precerebral arteries with cerebral infarction
433.81	Occlusion and stenosis of other specified precerebral artery with cerebral infarction
433.91	Occlusion and stenosis of unspecified precerebral artery with cerebral infarction
434.00	Cerebral thrombosis without mention of cerebral infarction
434.01	Cerebral thrombosis with cerebral infarction
434.11	Cerebral embolism with cerebral infarction
434.91	Cerebral artery occlusion unspecified with cerebral infarction
436	Acute, but ill-defined, cerebrovascular disease

**Exclusion Criteria**

- Principal ICD-9-CM diagnosis code for hemorrhagic stroke (ICD-9 codes 430, 431, and 432)
- Evidence of prior ischemic stroke or hemorrhagic stroke within 180 days of the stroke admission
- Transfer from within the hospital or from another acute care hospital (hospital-to-hospital transfer)
- Treatment at a hospital other than a general acute care hospital [i.e., hospitals without emergency rooms, children's hospitals, and long-term acute care facilities]

**Outcome Measures**

OSHPD measured the quality of hospital care provided by calculating hospital 30-day all-cause risk-adjusted mortality rates (RAMR) and 30-day all-cause risk-adjusted readmission rates (RARR) for patients with ischemic stroke.

**The Hospital 30-day RAMR** includes deaths from any cause within 30 days of the index stroke admission. It was chosen as the central outcome for this report because it is a reliable, well-defined, and easily validated performance measure. Use of 30-day mortality versus inpatient mortality is preferred for two reasons: 1) 30 days is a more consistent time frame because length of hospital stay varies across patients and types of hospitals, and 2) hospitals cannot “game” their outcomes by discharging patients who might die in the hospital prior to the 30-day mark. Deaths occurring beyond 30 days are not included because they are less likely to be related to the care received in the hospital. Dates of death were determined by linking the PDD to California death certificate records using Social Security numbers.

**The Hospital 30-day RARR** includes readmissions for any cause to any acute care hospital within 30 days of being discharged alive after treatment for ischemic stroke. Patients who were transferred from one hospital to another during the acute stroke episode are not considered to have been readmitted. This outcome is considered both a measure of hospital quality and a marker of resource utilization. Within the 30-day time frame, readmissions are often due to the care received during the index hospitalization and the subsequent transition to the outpatient setting.

Readmissions are costly to the healthcare system and are burdensome to patients and their caregivers. Measuring and reporting readmission rates across hospitals can reveal opportunities for quality improvement and reducing costs in the healthcare system. Hospitals may be able to lower readmission rates by both improving patient care and better planning for patients' needs once they leave the hospital. Similar mortality and readmission measures have been used by the Centers for Medicare and Medicaid Services (CMS) to modify hospital payments based on performance.

## **How the Outcomes were Measured**

OSHDP used a multivariable logistic regression model to determine the relationship between each of the risk factors and the probability of 30-day mortality or 30-day readmission while controlling for all other risk factors in the model.

**Risk-adjustment:** To make fair comparisons among different hospitals, the 30-day mortality and 30-day readmission rates were adjusted for risk factors including patient demographics, source of admission, stroke severity, and comorbidities that are known to influence the patient's risk of death or readmission. Hospitals with higher-risk patients are more likely to have higher death and readmission rates than hospitals with lower-risk patients, even when the medical care given is appropriate. Therefore, it is necessary to adjust for differences in the severity of patient illness across hospitals. Hospitals with more complex cases receive a larger risk-adjustment weight in the risk model than those hospitals with less complex cases. Thus, hospitals treating sicker patients are not at a disadvantage when their performance is compared with other hospitals.

**Validation:** Before developing the model, OSHDP contracted with the University of California, Los Angeles to conduct the validation study, "Ischemic Stroke Outcomes Validation Study in California, 2006-2009," ([www.oshpd.ca.gov](http://www.oshpd.ca.gov)) to determine whether existing data elements in the PDD could be used to develop valid measures of ischemic stroke quality. The study found that a risk-adjusted mortality measure based on the existing data at OSHDP was a feasible, reliable and valid measure of hospital stroke quality. The investigators found that important clinical processes and independent measures of stroke care quality were statistically significantly related to this patient outcome. Establishing the process-outcome link is important toward validating the outcome measures as reflective of the care provided. This is especially important in the stroke domain, where some stroke injury and sequelae may be reversed by utilizing standard processes of care immediately following a stroke.

**Risk Factors for Ischemic Stroke Outcomes:** Risk factors, including patient demographics, hospitalization characteristics, stroke severity and comorbidities, were selected for the

ischemic stroke model. Risk factors that appeared not to significantly lower the risk of death or readmission were eliminated from further analysis unless prior literature or clinical experience suggested a reason for this relationship.

## **Patient Demographic and Hospitalization Characteristics**

From January 1, 2014 to September 30, 2015, the number of women who were admitted for ischemic strokes was not significantly different from men. Most patients were White non-Hispanic (54.75%) followed by Hispanic (20.10%), Asian/Pacific Islander (10.95%), and Black (10.22%). Ischemic strokes occur most often in adults 65 years of age and older, who accounted for 69.09% of ischemic stroke patients. About 66% of the ischemic stroke patients' hospital care was paid by Medicare, while 14.18% was paid by Medi-Cal (Table 3).

**Table 3. Demographic Characteristics of Ischemic Stroke Patients**

	Number	Percent (%)
<b>Statewide</b>	65,789	
<b>SEX</b>		
Male	32,889	49.99
Female	32,898	50.01
<b>AGE GROUP</b>		
18-44	2,403	3.56
45-64	17,935	27.27
65+	45,451	69.09
<b>RACE/ETHNICITY</b>		
White	36,017	54.75
Black	6,721	10.22
Hispanic	13,221	20.10
Asian/Pacific Islander	7,205	10.95
Other	2,625	3.99
<b>EXPECTED PAYER</b>		
Medicare	43,726	66.46
Medi-Cal	9,332	14.18
Private	10,704	16.27
Self Pay	1,058	1.61
Other	969	0.48

## Risk-Adjustment Models

Table 4 shows the parameter estimates, odds ratios (ORs), and confidence intervals (CIs) for the risk factors in the 2014-2015 ischemic stroke 30-day mortality model. The strongest predictors of death were: cardiopulmonary arrest (OR = 8.434); metastatic cancer (OR = 7.150); decreased consciousness/altered mental status/coma (OR = 4.306); and acute myocardial infarction (OR = 2.343). Several conditions (e.g., hypertension, apraxia, other paralysis, current smoker, former TIA) that clinically would be expected to increase the risk of death were associated with a lower risk of mortality. Many of the counterintuitive findings seen in this analysis are likely explained by prior studies that found coding bias primarily responsible—patients who are severely ill and in the process of dying will have more severe acute conditions or complications that take precedence in coding over chronic diseases<sup>1</sup>.

<sup>1</sup> Iezzoni LI, Foley SM, Daley J, Hughes J, Fisher ES, Heeren T. Comorbidities, complications, and coding bias. Does the number of diagnosis codes matter in predicting in-hospital mortality? *JAMA* 1992; 267:2197-203.

**Table 4. Parameters for 30-Day Mortality Model**

<b>Risk Variables</b>	<b>Coefficient</b>	<b>Standard Error</b>	<b>P-Value</b>	<b>Odds Ratio</b>	<b>95% CI for Odds Ratio</b>
Intercept	-7.569	0.131	<.0001		
Age (Years)	0.058	0.002	<.0001	1.059	1.056-1.062
Male	-0.035	0.032	0.260	0.965	0.907-1.027
Black	-0.545	0.064	<.0001	0.580	0.512-0.657
Hispanic	-0.128	0.042	0.002	0.880	0.810-0.955
Asian	-0.409	0.052	<.0001	0.664	0.599-0.736
Other Race/Ethnicity	-0.208	0.080	0.009	0.812	0.694-0.950
Emergency Department (ED) Transfer	0.212	0.070	0.003	1.236	1.077-1.418
Hospital – Hospital (HH) Transfer	0.196	0.070	0.005	1.216	1.061-1.394
ED + HH Transfer	0.253	0.231	0.274	1.287	0.819-2.024
Source of Admission – Skilled Nursing	0.716	0.052	<.0001	2.046	1.848-2.265
Source of Admission – Other	0.038	0.087	0.666	1.038	0.875-1.232
Aphasia	0.201	0.034	<.0001	1.222	1.144-1.306
Hemiplegia/Hemiparesis	0.168	0.044	0.000	1.183	1.085-1.290
Other Paralysis	-0.089	0.144	0.538	0.915	0.690-1.214
Hemineglect	0.060	0.107	0.573	1.062	0.862-1.308
Vision Loss	-0.169	0.083	0.042	0.844	0.717-0.994
Apraxia	-1.120	0.304	0.000	0.326	0.180-0.592
Decreased Consciousness, Altered Mental Status, Coma	1.460	0.054	<.0001	4.306	3.870-4.790

**Table 4. Parameters for 30-Day Mortality Model**

<b>Risk Variables</b>	<b>Coefficient</b>	<b>Standard Error</b>	<b>P-Value</b>	<b>Odds Ratio</b>	<b>95% CI for Odds Ratio</b>
Seizure or Seizure Disorder	0.358	0.058	<.0001	1.431	1.278-1.602
Conjugate Deviation of Eyes	0.687	0.326	0.035	1.988	1.050-3.764
Other Cerebral Ischemic Signs or Symptoms	-0.241	0.104	0.020	0.786	0.641-0.963
Perenteral Nutrition	0.331	0.214	0.121	1.392	0.916-2.117
Dysphagia	0.265	0.036	<.0001	1.304	1.214-1.400
Admission Elevated Glucose	-0.071	0.085	0.400	0.931	0.789-1.099
Acute Myocardial Infarction	0.852	0.081	<.0001	2.343	2.001-2.744
Left-sided Valvular Heart Disease	-0.130	0.112	0.242	0.878	0.705-1.092
Right-sided Valvular Heart Disease	-0.266	0.100	0.008	0.766	0.630-0.932
Atrial Fibrillation	0.444	0.032	<.0001	1.559	1.464-1.659
Cardiopulmonary Arrest	2.132	0.059	<.0001	8.434	7.513-9.467
Systolic Heart Failure	-0.376	0.654	0.565	0.686	0.191-2.471
History of CHF (Left Heart Failure, Cardiomyopathy)	0.297	0.037	<.0001	1.346	1.252-1.447
Any Ischemic Heart Disease: CAD, Angina, AMI, prior MI	0.006	0.035	0.869	1.006	0.939-1.078
Dementia or Alzheimer's Disease	0.340	0.050	<.0001	1.405	1.273-1.550
Low Platelet Count	0.606	0.164	0.000	1.833	1.328-2.530
Bleeding Disorders (no platelet disorders)	0.847	0.175	<.0001	2.332	1.654-3.288
Anticoagulation*	0.000				
Hypercoagulable State	0.332	0.128	0.009	1.394	1.085-1.790

**Table 4. Parameters for 30-Day Mortality Model**

<b>Risk Variables</b>	<b>Coefficient</b>	<b>Standard Error</b>	<b>P-Value</b>	<b>Odds Ratio</b>	<b>95% CI for Odds Ratio</b>
Falls	-0.140	0.068	0.041	0.870	0.761-0.994
Current Smoker	-0.079	0.040	0.051	0.924	0.854-1.000
Recurrent Strokes	0.205	0.057	0.000	1.228	1.099-1.372
Former TIA	-0.169	0.101	0.094	0.844	0.693-1.029
TIA Resolved	0.089	0.049	0.070	1.093	0.993-1.204
Fever 48 hr	0.420	0.138	0.002	1.522	1.161-1.994
Pulmonary Circulation Disease	0.026	0.070	0.715	1.026	0.894-1.177
Peripheral Vascular Disease	-0.029	0.041	0.477	0.971	0.896-1.053
Hypertension	-0.097	0.039	0.014	0.907	0.840-0.980
Paralysis	0.822	0.048	<.0001	2.275	2.069-2.501
Chronic Pulmonary Disease	-0.024	0.041	0.564	0.977	0.901-1.059
Diabetes w/o Chronic Complications	0.131	0.037	0.000	1.140	1.061-1.225
Diabetes w/ Chronic Complications	0.002	0.055	0.969	1.002	0.901-1.115
Renal Failure	0.207	0.038	<.0001	1.229	1.142-1.323
Liver Disease	0.324	0.108	0.003	1.383	1.120-1.708
Chronic Peptic Ulcer Disease	-1.219	1.115	0.274	0.295	0.033-2.626
Acquired Immune Deficiency Syndrome	0.570	0.619	0.357	1.769	0.526-5.950
Lymphoma	0.588	0.179	0.001	1.801	1.268-2.556
Metastatic Cancer	1.967	0.084	<.0001	7.150	6.066-8.428

**Table 4. Parameters for 30-Day Mortality Model**

<b>Risk Variables</b>	<b>Coefficient</b>	<b>Standard Error</b>	<b>P-Value</b>	<b>Odds Ratio</b>	<b>95% CI for Odds Ratio</b>
Solid Tumor w/out Metastasis	0.569	0.090	<.0001	1.766	1.482-2.105
Rheumatoid Arthritis/Collagen Vas	-0.010	0.089	0.913	0.990	0.832-1.178
Weight Loss	0.373	0.062	<.0001	1.452	1.284-1.640
Fluid and Electrolyte Disorders	0.315	0.036	<.0001	1.371	1.279-1.470
Chronic Blood Loss Anemia	0.284	0.200	0.155	1.328	0.898-1.965
Deficiency Anemia	-0.006	0.040	0.886	0.994	0.920-1.075
Alcohol Abuse	-0.142	0.091	0.121	0.868	0.726-1.038
Drug Abuse	0.104	0.109	0.341	1.110	0.896-1.375
Psychoses	-0.096	0.074	0.192	0.908	0.786-1.050

\*Parameter could not be estimated accurately since few patients with condition survived.

Table 5 shows the parameter estimates, ORs, and CIs for the risk factors in the 2014-2015 ischemic stroke 30-day readmissions model. The strongest predictors of 30-day readmissions were: metastatic cancer (OR = 2.006); weight loss (OR = 1.570); solid tumor w/out metastasis (OR = 1.499) and liver disease (OR = 1.459).



**Table 5. Parameters for Readmission Model**

<b>Risk Variables</b>	<b>Coefficient</b>	<b>Standard Error</b>	<b>P-Value</b>	<b>Odds Ratio</b>	<b>95% CI for Odds Ratio</b>
Intercept	-2.660	0.074	<.0001		
Age (Years)	0.001	0.001	0.285	1.001	0.999-1.003
Black	0.121	0.041	0.004	1.128	1.041-1.223
Hispanic	0.045	0.034	0.183	1.046	0.979-1.116
Asian	0.068	0.041	0.101	1.070	0.987-1.161
Hospital – Hospital Transfer	0.346	0.058	<.0001	1.413	1.260-1.583
ED + HH Transfer	0.236	0.206	0.252	1.266	0.846-1.893
Hemineglect	0.134	0.107	0.213	1.143	0.926-1.411
Vision Loss	0.179	0.065	0.006	1.196	1.052-1.360
Seizure or Seizure Disorder	0.128	0.052	0.014	1.136	1.026-1.259
Perenteral Nutrition	0.317	0.231	0.171	1.372	0.873-2.158
Dysphagia	0.188	0.035	<.0001	1.207	1.127-1.292
Acute Myocardial Infarction	0.263	0.084	0.002	1.300	1.102-1.533
Cardiopulmonary Arrest	0.346	0.084	<.0001	1.414	1.199-1.667
History of CHF (L Heart Failure, Cardiomyopathy)	0.233	0.033	<.0001	1.263	1.183-1.348
Any Ischemic Heart Disease: CAD, Angina, AMI, prior MI	0.189	0.030	<.0001	1.208	1.138-1.281
Bleeding Disorders (no platelet disorders)	0.160	0.192	0.404	1.173	0.806-1.708
Recurrent Strokes	0.232	0.046	<.0001	1.261	1.152-1.379
TIA Resolved	0.250	0.041	<.0001	1.284	1.185-1.392
Fever 48 hr	-0.071	0.148	0.634	0.932	0.697-1.246

**Table 5. Parameters for Readmission Model**

<b>Risk Variables</b>	<b>Coefficient</b>	<b>Standard Error</b>	<b>P-Value</b>	<b>Odds Ratio</b>	<b>95% CI for Odds Ratio</b>
Pulmonary Circulation Disease	0.026	0.067	0.697	1.027	0.900-1.171
Peripheral Vascular Disease	0.043	0.036	0.240	1.043	0.972-1.120
Hypertension	0.019	0.033	0.559	1.020	0.955-1.088
Paralysis	0.180	0.035	<.0001	1.197	1.118-1.281
Chronic Pulmonary Disease	0.143	0.035	<.0001	1.153	1.077-1.235
Diabetes w/o Chronic Complications	0.193	0.030	<.0001	1.213	1.144-1.287
Diabetes w/ Chronic Complications	0.187	0.042	<.0001	1.206	1.112-1.308
Renal Failure	0.250	0.033	<.0001	1.283	1.203-1.370
Liver Disease	0.378	0.078	<.0001	1.459	1.252-1.700
Metastatic Cancer	0.696	0.091	<.0001	2.006	1.677-2.399
Solid Tumor w/o Metastasis	0.405	0.086	<.0001	1.499	1.267-1.772
Weight Loss	0.451	0.059	<.0001	1.570	1.399-1.762
Fluid and Electrolyte Disorders	0.162	0.032	<.0001	1.176	1.104-1.253
Chronic Blood Loss Anemia	0.227	0.186	0.222	1.254	0.872-1.805
Deficiency Anemia	0.357	0.033	<.0001	1.429	1.339-1.525
Psychoses	0.110	0.058	0.057	1.116	0.997-1.249

## Risk Model Performance

For each logistic regression model, OSHPD computed summary statistics to assess model performance: model evaluation, goodness of fit, discrimination, and calibration.

### **Discrimination: 30-Day Mortality/30-Day Readmission**

Risk models that distinguish well between patients who have an adverse event and those who do not are said to have good discrimination. A commonly used measure of discrimination is the C-statistic, also known as the area under the Receiver Operating Characteristic (ROC) curve. For all possible pairs of patients, where one has a 30-day death or a 30-day readmission and the other does not, the C-statistic describes the proportion of pairs where the patient with the event had a higher predicted risk of the event than the patient without the event. C-statistics range from 0.5 to 1, with higher values indicating better discrimination. For the 2014-2015 mortality risk model, the C-statistic was 0.85, which is generally considered excellent model discrimination. For the readmission risk model, the C-statistic was 0.63, indicating that the readmissions model was much less accurate than the mortality model in predicting which patients had the event. However, readmissions are more difficult to predict than outcomes like mortality or complications, and this C-statistic is typical of those found in the health services literature.

### **Calibration: 30-Day Mortality/30-Day Readmission**

Calibration refers to the ability of a risk model to match predicted and observed outcomes (e.g., deaths and readmissions). A model in which the number of observed outcomes matches closely with the predicted number of outcomes across different strata of the data demonstrates good calibration. Good calibration is essential for accurate risk adjustment. A common measure of calibration is the Hosmer-Lemeshow  $\chi^2$  test, which compares observed and predicted outcomes over deciles of risk. The p-value of the Hosmer-Lemeshow test statistic for this 30-day readmission risk model is <0.001, indicating there were significant differences between observed and predicted outcomes over deciles of risk, indicating poor calibration. That is, predicted readmissions were not consistent with actual readmissions across the data. The finding of poor calibration for risk models based on administrative data is not uncommon, especially when analyses employ large numbers of cases and the test becomes sensitive to small differences between the number of predicted and expected events.

To better understand problems in calibration, the data were partitioned into 10 groups by patient risk, and observed outcomes were compared with predicted outcomes for each of the groups. Table 6 presents these results for the mortality outcome with the lowest risk patients in Risk Group 1 and the highest risk patients in Risk Group 10. Table 7 presents the results for the readmission outcome with the lowest risk patients in Risk Group 1 and the highest risk patients in Risk Group 10. Among the 6,579 patients in mortality Risk Group 10, 2,744 patients died, and the model predicted 2,861.3 patient deaths. Assuming a Poisson distribution for a binary outcome, the predicted range of deaths for Risk Group 10 is 2,522.1 to 3,210.8. The observed number of 2,744 deaths falls within the range of predicted deaths. Overall the risk model shows no systematic underestimation or overestimation of death or readmission cases at the extremes.

**Table 6. Calibration of Risk Model for 30-Day Mortality, 2014-2015**

<b>Risk Group</b>	<b>Ischemic Stroke Cases</b>	<b>Observed Deaths</b>	<b>Predicted Deaths</b>	<b>Difference</b>	<b>95% CI of Predicted Deaths</b>
1	6,578	36	45.8	9.8	(37.4-56.8)
2	6,579	70	89.0	19.0	(734.0-107.6)
3	6,579	95	134.4	39.4	(112.3-161.9)
4	6,579	141	192.4	51.4	(161.0-231.1)
5	6,579	182	268.9	86.9	(225.6-322.3)
6	6,579	296	373.8	77.8	(313.5-447.7)
7	6,579	502	522.4	20.4	(438.2-624.5)
8	6,579	908	752.8	-155.2	(631.6-897.6)
9	6,579	1,480	1,213.4	-266.7	(1,018.2-1,441.6)
10	6,579	2,744	2,861.3	117.3	(2,522.1-3,210.8)
	65,789	6,454	6,454	0	

Note: Risk Group 1 is at lowest risk for mortality and Risk Group 10 is at highest risk.

**Table 7. Calibration of Risk Model for 30-Day Readmission, 2014-2015**

<b>Risk Group</b>	<b>Ischemic Stroke Cases</b>	<b>Observed Readmissions</b>	<b>Predicted Readmissions</b>	<b>Difference</b>	<b>95% CI of Predicted Readmissions</b>
1	6,331	384	445.7	61.7	(419.3-473.9)
2	6,218	439	462.9	23.9	(428.9-499.5)
3	6,255	496	519.1	23.1	(476.8-565.3)
4	6,278	534	554.6	20.6	(507.9-605.6)
5	6,257	619	608.1	-10.9	(548.1-674.6)
6	6,268	677	667.2	-9.9	(598.1-744.1)
7	6,268	806	747.4	-58.6	(663.7-841.2)
8	6,268	908	855.6	-52.4	(753.2-970.8)
9	6,268	1,101	1031.9	-69.1	(899.5-1,181.2)
10	6,270	1,428	1,501.7	73.7	(1,292.1-1,734.6)
	62,681	7,392	7,394.1	2.1	

Note: Risk Group 1 is at lowest risk for readmissions and Risk Group 10 is at highest risk.

## Calculation of Hospital Outcome Measures

### 30-Day Mortality/Readmission Outcome

The risk-adjusted rate represents the best estimate of what a hospital mortality/readmission rate would have been if the hospital had a patient case mix identical to the statewide average. Thus, this rate is comparable among hospitals because it accounts for the differences in patient severity of illness.

The risk-adjusted rate is computed first by dividing the hospital's observed rate by the hospital's expected rate (obtained from the risk model calculation) to get the observed/expected (O/E) ratio. If the O/E ratio is greater than one, the hospital has a higher mortality rate than expected based on its patient mix. If the O/E ratio is less than one, the hospital has a lower mortality rate than expected. The O/E ratio is then multiplied by the overall state mortality to obtain the hospital's risk-adjusted mortality rate. This results in the 2014-2015 hospital 30-day mortality rate of 9.8% and the 30-day readmission rate of 11.8%. However, because a hospital's point estimate of the risk-adjusted rate can be attributed to chance, this report determines the performance rating not based on a point estimate of the risk-adjusted rate, but based on a comparison of the 98% confidence interval (CI) of each hospital's risk-adjusted rate to the California average rate<sup>2</sup>. As shown in Tables 8 and 9, if the upper 98% CI of a hospital's risk-adjusted rate is below the state average rate, indicating the hospital's risk-adjusted rate is significantly lower than the state average, then the hospital's performance rating is "Better." If the lower 98% CI of a hospital's risk-adjusted rate is above the state average rate, indicating the hospital's risk-adjusted rate is significantly higher than the state average, then the performance rating is "Worse." If the state average rate is within the 98% CI of a hospital's risk-adjusted rate, then the performance rating is "As Expected."

### Limitations of the Data and Models

The preferred method to produce hospital outcome reports includes the collection of detailed clinical data to provide accurate risk adjustment. This approach requires medical chart abstraction, which is expensive and time-consuming; consequently, it has not been widely implemented by public reporting agencies. Using health insurance claims or administrative data for public outcomes reporting offers several advantages, including minimal data collection costs and the ability to produce reports for a large number of procedures and conditions. However, most approaches to risk adjustment that rely on administrative data have demonstrated deficiencies that threaten their usefulness as quality assessment tools.

**Types of Data Quality Errors:** Quality of care is one reason a hospital's mortality/readmission rate may be unusually high or low. However, there are additional factors that may contribute to a hospital's 30-day mortality/readmission rate.

---

<sup>2</sup> Luft HS, Brown BW Jr. Calculating the probability of rare events: Why settle for an approximation? *Health Services Research*. 1993; 28:419-439.

**Hospital data errors:** Hospitals that failed to report important risk factors or had other data quality problems could have received too little “credit” for their patient risk in the risk-adjustment process. Some facilities have applied for and have been granted “modifications” to standard inpatient data reporting requirements. Other facilities were unable to complete specific fields as required and were deemed “non-compliant” at the time of reporting. OSHPD provides a list of known data errors and their affected variables for facilities with approved modifications and non-compliant facilities ([www.oshpd.ca.gov](http://www.oshpd.ca.gov)).

**Unmeasured risk:** Administrative datasets provide limited data, based on ICD-9-CM codes, to characterize patients’ risk of death/readmission. This includes data errors for both known risk factors and unknown risk factors. For known risk factors, unmeasured risk may be in the form of hospitals incorrectly reporting ICD-9-CM codes in the patient discharge data records.

In addition, unknown risk factors not reported in the patient discharge data records may also account for unmeasured patient risk differences not explained by the current model.

**Limited outcome measure:** This report focuses on two outcome measures: 30-day mortality and 30-day readmission. If a hospital’s risk-adjusted 30-day mortality rate is a valid quality of care indicator, then hospitals with low rates are managing their patients in ways that maximize the likelihood of successful outcomes. These management practices are also known as processes of care, because they describe the process by which nurses, physicians, and other health professionals provide care at the bedside. Other processes of care include functional recovery, health-related quality of life and other clinical outcomes. These measures may be as or more meaningful than the outcomes chosen but would require additional resources to collect and develop.

## Other Stroke Quality Measures

### AHRQ Inpatient Stroke Mortality Measure

The Agency for Healthcare Research and Quality (AHRQ) has developed an Inpatient Quality Indicator – Acute Stroke Mortality Rate (IQI #17), and OSHPD has publicly reported this as a measure of hospital stroke care since 2006. However, there are several important differences between the AHRQ inpatient mortality measure (Version 5.0) and the OSHPD 30-day mortality measure.

- This outcomes report includes only ischemic stroke patients, while IQI #17 includes all acute stroke cases and breaks them further into three strata: subarachnoid stroke, hemorrhagic stroke and ischemic stroke.
- This report encompasses two years of data, while IQI #17 is reported annually.
- This report includes patients with a primary diagnosis of cerebral thrombosis without mention of cerebral infarction, while IQI #17 excludes those patients.
- This report excludes patients with prior ischemic or hemorrhagic stroke within 180 days of the stroke admission, while IQI #17 does not have the exclusion.
- This report includes all deaths (inside and outside of hospitals) that occur up to 30 days after admission, while IQI #17 includes only inpatient deaths.
- This report uses a risk model based on both clinical logic and empirical considerations, while the IQI #17 risk model is empirically based.

- In this report, a 98% confidence interval is applied to identify hospitals whose performance differs significantly from the state average while the IQI #17 uses a 95% confidence interval to identify hospital outliers.

## CMS Stroke Mortality and Readmission Measures

The Centers for Medicare and Medicaid Services (CMS) recently provided the details for two stroke measures: Hospital 30-Day Mortality Following Acute Ischemic Stroke and Hospital 30-Day Readmission Following Acute Ischemic Stroke. One major difference between the OSHPD report and the CMS measures is the risk factors included in the model. In the OSHPD report, both 30-day mortality and readmission models adjusted for stroke severity while the CMS measures did not include stroke severity as a predictive variable. The OSHPD C-statistic for the mortality model is higher than the C-statistic published by CMS (0.85 vs 0.74), while the C-statistic for the OSHPD readmissions model is similar to the CMS model (0.63 vs 0.60).

## Results: Risk-Adjusted Outcomes

**Risk-adjusted 30-day mortality rates:** Among the 65,789 ischemic stroke patients admitted to 324 California hospitals between January 1, 2014 and September 30, 2015, 6,454 patients died within 30 days of the index admission, reflecting an overall statewide 30-day mortality rate of 9.8% (Table 8). The observed 30-day mortality rates at California hospitals ranged from 0% to 25.6%. The expected 30-day mortality rate, calculated by the risk model to reflect patients' demographics and severity of illness, varied between 3.1% and 16.3%. The 30-day RAMRs, which evaluate hospital performance, ranged from 0% to 29.7%. Among the 14 hospitals rated "Worse" than expected, the average RAMR was 18.8% (range: 13.2–29.7%), more than three times the average RAMR for the 11 hospitals rated "Better" than expected (average 5.5%; range: 1.6–6.8%).

**Risk-adjusted 30-day readmission rates:** Among the 62,681 ischemic stroke patients discharged from 324 California hospitals between January 1, 2014 and September 30, 2015, 7,394 patients were readmitted for any reason within 30 days of discharge following an ischemic stroke hospitalization, reflecting an overall statewide 30-day readmission rate of 11.8% (Table 9). The observed 30-day readmission rates at California hospitals ranged from 1.9% to 20.2%. The expected 30-day readmission rate, calculated by the risk model to reflect patients' demographics and severity of illness, varied between 9.1% and 15.1%. The 30-day RARRs ranged from 2.0% to 20.5%. Among the six hospitals rated "Worse" than expected, the average RARR was 16.9% (range: 15.4–19.1%), almost three times the average RARR for the three hospitals rated "Better" than expected (average 5.8%; range: 5.4–6.3%).

GUIDE TO INTERPRETING TABLES 8 & 9: HOSPITAL RISK-ADJUSTED OUTCOMES RESULTS, 2014-2015	
<b>Ischemic Stroke Cases</b>	The total number of acute ischemic stroke cases submitted to PDD for 2014-2015.
<b>Ischemic Stroke Deaths</b>	The number of deaths includes all deaths occurring within 30 days of the index stroke admission.

<b>GUIDE TO INTERPRETING TABLES 8 &amp; 9: HOSPITAL RISK-ADJUSTED OUTCOMES RESULTS, 2014-2015</b>	
<b>Ischemic Stroke Readmissions</b>	The number of hospital readmissions within 30 days of being discharged from the hospital. Patients who were transferred from one hospital to another during the acute stroke episode are not considered to be a readmission.
<b>Observed Mortality Rate</b>	The ratio of the number of ischemic stroke deaths and the ischemic stroke cases multiplied by 100: Observed Mortality Rate = Number of Ischemic Stroke Deaths/ Ischemic Stroke Cases × 100.
<b>Observed Readmission Rate</b>	The ratio of the number of ischemic stroke readmissions and the ischemic stroke cases multiplied by 100: Observed Readmission Rate = Number of Ischemic Stroke Readmissions/ Ischemic Stroke Cases × 100.
<b>Expected Mortality Rate</b>	The ratio of the expected number of ischemic stroke deaths predicted for a provider (after risk-adjusting for their patient population) and the ischemic stroke cases multiplied by 100: Expected Mortality Rate = Number of Expected Deaths/ Ischemic Stroke Cases × 100.
<b>Expected Readmission Rate</b>	The ratio of the expected number of ischemic stroke readmissions predicted for a provider (after risk-adjusting for their patient population) and the ischemic stroke cases multiplied by 100: Expected Readmission Rate = Number of Expected Readmissions/ Ischemic Stroke Cases × 100.
<b>Risk-Adjusted Mortality Rate (RAMR) and 98% Confidence Interval (CI)</b>	The RAMR is obtained by multiplying the California observed mortality rate by a provider's O/E ratio. The 98% confidence interval represents the confidence in the estimate for the RAMR. The lower and upper confidence limits are calculated using Poisson exact confidence interval calculations.
<b>Risk-Adjusted Readmission Rate (RARR) and 98% Confidence Interval (CI)</b>	The RARR is obtained by multiplying the California observed readmission rate by a provider's O/E ratio. The 98% confidence interval represents the confidence in the estimate for the RARR. The lower and upper confidence limits are calculated using Poisson exact confidence interval calculations.
<b>Performance Rating</b>	The performance rating is based on a comparison of each provider's risk-adjusted rate to the California observed rate. A provider is classified as "Better" if the upper 98% confidence limit of its risk-adjusted rate falls below the California observed rate. A provider is classified as "Worse" if the lower 98% confidence limit of its risk-adjusted rate is higher than the California observed rate.



**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
Alameda	Alameda Hospital	93	8	8.60	13.33	6.33	2.54-12.17	
	Alta Bates Summit Medical Center	488	43	8.81	8.77	9.86	7.08-13.21	
	Alta Bates Summit Medical Center – Alta Bates Campus	297	17	5.72	9.08	6.18	3.50-9.90	
	Eden Medical Center	427	46	10.77	10.16	10.40	7.52-13.81	
	Highland Hospital	177	8	4.52	3.94	11.25	4.51-22.13	
	Kaiser Foundation Hospital – Fremont	80	19	23.75	12.62	18.46	11.38-26.89	Worse
	Kaiser Foundation Hospital – Hayward	83	12	14.46	12.87	11.02	5.58-18.32	
	Kaiser Foundation Hospital – Oakland Campus	137	13	9.49	9.44	9.86	5.14-16.35	
	Kaiser Foundation Hospital – Oakland/Richmond	435	33	7.59	10.46	7.12	4.84-9.94	
	Kaiser Foundation Hospital – San Leandro	147	25	17.01	12.71	13.13	8.63-18.58	

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
Alameda (continued)	Saint Rose Hospital	89	8	8.99	7.32	12.04	5.10-22.78	
	San Leandro Hospital	53	5	9.43	8.02	11.54	3.32-25.70	
	Valleycare Medical Center	99	9	9.09	10.43	8.55	3.68-15.99	
	Washington Hospital – Fremont	324	37	11.42	11.35	9.87	6.91-13.45	
Amador	Sutter Amador Hospital	128	17	13.28	11.06	11.78	6.78-18.36	
Butte	Enloe Medical Center – Esplanade	397	52	13.10	10.76	11.94	8.90-15.51	
	Feather River Hospital	109	12	11.01	13.14	8.22	4.10-13.99	
	Oroville Hospital	244	13	5.33	6.91	7.56	3.70-13.29	
Calaveras	Mark Twain Medical Center	39	5	12.82	10.21	12.32	3.91-26.76	
Contra Costa	Contra Costa Regional Medical Center	115	5	4.35	4.88	8.74	2.36-20.75	
	Doctors Medical Center – San Pablo	99	10	10.10	9.17	10.81	5.01-19.01	

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
Contra Costa (continued)	John Muir Medical Center – Concord Campus	305	26	8.52	9.70	8.62	5.58-12.50	
	John Muir Medical Center – Walnut Creek Campus	445	54	12.13	13.65	8.72	6.52-11.28	
	Kaiser Foundation Hospital – Antioch	267	36	13.48	12.26	10.79	7.65-14.52	
	Kaiser Foundation Hospital – Walnut Creek	327	36	11.01	13.56	7.96	5.61-10.84	
	San Ramon Regional Medical Center	198	26	13.13	13.66	9.43	6.11-13.54	
	Sutter Delta Medical Center	127	9	7.09	9.58	7.26	3.12-13.45	
Del Norte	Sutter Coast Hospital	83	6	7.23	14.58	4.86	1.64-10.33	
El Dorado	Marshall Medical Center	158	21	13.29	10.21	12.76	7.73-19.14	
Fresno	Adventist Medical Center – Reedley	30	2	6.67	6.79	9.63	0.74-34.14	
	Clovis Community Medical Center	298	26	8.72	8.61	9.94	6.33-14.57	
	Community Regional Medical Center – Fresno	746	71	9.52	7.09	13.16	10.26-16.51	Worse

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
Fresno (continued)	Kaiser Foundation Hospital – Fresno	286	35	12.24	10.61	11.31	7.81-15.55	
	Saint Agnes Medical Center	624	65	10.42	10.34	9.88	7.61-12.53	
Humboldt	Mad River Community Hospital	50	3	6.00	7.94	7.42	1.12-21.99	
	Saint Joseph Hospital – Eureka	173	14	8.09	9.97	7.97	4.15-13.32	
Imperial	El Centro Regional Medical Center	188	13	6.91	9.89	6.86	3.56-11.57	
	Pioneers Memorial Healthcare District	144	7	4.86	7.79	6.12	2.15-12.89	
Kern	Bakersfield Heart Hospital	71	11	15.49	8.17	18.60	9.08-31.84	
	Bakersfield Memorial Hospital	327	28	8.56	7.10	11.82	7.65-17.11	
	Kern Medical Center	47	2	4.26	3.11	13.42	1.02-50.25	
	Mercy Hospital – Bakersfield	189	16	8.47	8.14	10.21	5.72-16.27	
	Ridgecrest Regional Hospital	39	10	25.64	11.15	22.56	10.93-37.88	Worse

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
Kern (continued)	San Joaquin Community Hospital	506	63	12.45	7.94	15.39	11.76-19.57	Worse
Kings	Adventist Medical Center	260	22	8.46	7.45	11.15	6.81-16.84	
Lake	Sutter Lakeside Hospital	48	8	16.67	9.92	16.49	6.93-30.22	
Los Angeles	Alhambra Hospital	96	4	4.17	7.28	5.61	1.28-14.68	
	Antelope Valley Hospital	413	58	14.04	7.20	19.14	14.52-24.46	Worse
	Beverly Hospital	124	12	9.68	9.31	10.20	5.23-17.38	
	California Hospital Medical Center – Los Angeles	331	19	5.74	5.19	10.86	6.27-17.11	
	Cedars Sinai Medical Center	707	47	6.65	12.06	5.41	3.90-7.22	Better
	Centinela Hospital Medical Center	390	20	5.13	5.71	8.82	5.05-13.97	
	Citrus Valley Medical Center – Inter-Community Campus	107	10	9.35	10.18	9.00	4.11-16.13	
	Citrus Valley Medical Center – Queen of the Valley Campus	330	30	9.09	8.31	10.73	7.10-15.29	

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
Los Angeles (continued)	Coast Plaza Hospital	30	0	0.00	7.88	0.00	0.00-15.79	
	College Medical Center	32	2	6.25	16.33	3.75	0.34-11.62	
	Community and Mission Hospital of Huntington Park – Slauson	31	2	6.45	8.02	7.89	0.70-25.54	
	Community Hospital of Long Beach	53	5	9.43	11.16	8.29	2.33-18.40	
	Foothill Presbyterian Hospital – Johnston Memorial	97	10	10.31	6.83	14.80	6.60-27.02	
	Garfield Medical Center	280	22	7.86	10.67	7.22	4.46-10.81	
	Glendale Adventist Medical Center – Wilson Terrace	365	32	8.77	14.19	6.06	4.15-8.42	Better
	Glendale Memorial Hospital and Medical Center	132	6	4.55	8.10	5.50	1.71-12.36	
	Good Samaritan Hospital – Los Angeles	188	10	5.32	7.80	6.69	2.97-12.31	
	Henry Mayo Newhall Memorial Hospital	224	13	5.80	8.00	7.11	3.47-12.45	
	Hollywood Presbyterian Medical Center	228	17	7.46	7.97	9.17	5.15-14.61	

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
Los Angeles (continued)	Huntington Memorial Hospital	487	35	7.19	9.95	7.09	4.79-9.95	
	Kaiser Foundation Hospital – Baldwin Park	378	30	7.94	7.39	10.54	6.94-15.08	
	Kaiser Foundation Hospital – Downey	472	29	6.14	6.29	9.59	6.18-13.97	
	Kaiser Foundation Hospital – Panorama City	184	27	14.67	8.62	16.70	10.97-23.66	Worse
	Kaiser Foundation Hospital – South Bay	274	25	9.12	7.93	11.28	7.26-16.41	
	Kaiser Foundation Hospital – Sunset	397	35	8.82	9.49	9.11	6.35-12.49	
	Kaiser Foundation Hospital – West Los Angeles	494	31	6.28	6.74	9.13	6.05-13.05	
	Kaiser Foundation Hospital – Woodland Hills	329	23	6.99	10.13	6.77	4.15-10.22	
	Lakewood Regional Medical Center	278	24	8.63	6.75	12.54	7.75-18.71	
	Long Beach Memorial Medical Center	613	48	7.83	8.99	8.55	6.28-11.25	

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
Los Angeles (continued)	Los Angeles County/Harbor – UCLA Medical Center	215	9	4.19	4.47	9.18	3.85-17.41	
	Los Angeles County/Olive View – UCLA Medical Center	110	1	0.91	4.28	2.09	0.02-12.03	
	Los Angeles County/University of Southern California Medical Center	200	15	7.50	5.42	13.56	7.44-22.01	
	Marina Del Rey Hospital	72	8	11.11	8.32	13.11	5.37-24.83	
	Memorial Hospital of Gardena	100	6	6.00	6.90	8.53	2.81-18.45	
	Methodist Hospital of Southern California	476	38	7.98	11.59	6.76	4.73-9.25	Better
	Mission Community Hospital – Panorama Campus	39	4	10.26	10.55	9.54	2.33-23.00	
	Monterey Park Hospital	60	4	6.67	8.94	7.32	1.75-18.39	
	Northridge Hospital Medical Center	264	35	13.26	10.73	12.12	8.36-16.64	
	Olympia Medical Center	55	2	3.64	12.03	2.97	0.23-10.81	



**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
Los Angeles (continued)	Pacific Alliance Medical Center, Inc.	102	3	2.94	8.33	3.46	0.53-10.40	
	Palmdale Regional Medical Center	166	12	7.23	5.72	12.40	5.92-22.04	
	PIH Hospital – Downey	163	17	10.43	8.45	12.11	6.83-19.14	
	Pomona Valley Hospital Medical Center	557	61	10.95	10.90	9.86	7.50-12.59	
	Presbyterian Intercommunity Hospital	574	66	11.50	12.37	9.12	7.05-11.51	
	Providence Holy Cross Medical Center	310	38	12.26	9.68	12.43	8.84-16.76	
	Providence Little Company of Mary Medical Center – San Pedro	151	19	12.58	9.97	12.38	7.27-19.00	
	Providence Little Company of Mary Medical Center – Torrance	567	44	7.76	7.69	9.90	7.04-13.38	
	Providence Saint John’s Health Center	148	15	10.14	10.77	9.23	4.85-15.29	
	Providence Saint Joseph Medical Center	524	55	10.50	11.72	8.78	6.60-11.32	
	Providence Tarzana Medical Center	246	24	9.76	11.38	8.41	5.30-12.40	

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
Los Angeles (continued)	Ronald Reagan UCLA Medical Center	450	41	9.11	14.12	6.33	4.54-8.45	Better
	Saint Francis Medical Center	329	31	9.42	9.60	9.63	6.56-13.38	
	Saint Mary Medical Center – Long Beach	198	15	7.58	9.02	8.23	4.35-13.59	
	Saint Vincent Medical Center	136	7	5.15	8.05	6.27	2.42-12.99	
	San Dimas Community Hospital	49	2	4.08	8.75	4.57	0.35-16.54	
	San Gabriel Valley Medical Center	150	14	9.33	13.38	6.85	3.68-11.11	
	Santa Monica – UCLA Medical Center and Orthopedic Hospital	184	5	2.72	8.59	3.10	0.82-7.58	Better
	Sherman Oaks Hospital	68	1	1.47	8.94	1.61	0.02-9.31	Better
	Southern California Hospital at Culver City	111	4	3.60	7.52	4.70	1.04-12.22	
	Torrance Memorial Medical Center	576	53	9.20	10.20	8.85	6.56-11.55	
	University of Southern California Verdugo Hills Hospital	104	17	16.35	10.21	15.70	8.96-24.28	

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
Los Angeles (continued)	Valley Presbyterian Hospital	181	11	6.08	9.42	6.33	2.98-11.24	
	West Hills Hospital and Medical Center	212	17	8.02	10.30	7.64	4.31-12.17	
	White Memorial Medical Center	288	24	8.33	9.25	8.84	5.56-13.05	
	Whittier Hospital Medical Center	93	2	2.15	5.58	3.78	0.29-14.29	
Madera	Madera Community Hospital	56	10	17.86	6.31	27.74	12.73-48.46	Worse
Marin	Kaiser Foundation Hospital – San Rafael	153	20	13.07	10.89	11.78	7.14-17.76	
	Marin General Hospital	235	24	10.21	12.70	7.89	4.95-11.69	
	Novato Community Hospital	53	1	1.89	7.10	2.61	0.03-15.77	
Mendocino	Frank R. Howard Memorial Hospital	33	4	12.12	15.33	7.76	1.86-17.99	
	Mendocino Coast District Hospital	32	5	15.63	9.40	16.31	4.62-35.69	
	Ukiah Valley Medical Center	92	20	21.74	11.95	17.85	11.03-26.17	Worse

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
Merced	Mercy Medical Center – Merced	245	20	8.16	8.23	9.73	5.70-15.11	
Monterey	Community Hospital Monterey Peninsula	327	27	8.26	9.66	8.39	5.33-12.30	
	Natividad Medical Center	45	2	4.44	4.83	9.03	0.85-31.17	
	Salinas Valley Memorial Hospital	312	32	10.26	9.68	10.39	7.03-14.52	
Napa	Queen of the Valley Hospital – Napa	185	28	15.14	11.62	12.78	8.47-18.04	
	Saint Helena Hospital	33	4	12.12	11.98	9.93	2.41-23.24	
Nevada	Sierra Nevada Memorial Hospital	157	23	14.65	10.72	13.40	8.39-19.71	
Orange	AHMC Anaheim Regional Medical Center	180	14	7.78	8.07	9.45	5.11-15.58	
	Fountain Valley Regional Hospital and Medical Center – Euclid	418	44	10.53	10.49	9.84	7.18-13.03	
	Garden Grove Hospital and Medical Center	67	4	5.97	8.56	6.84	1.49-17.44	
	Hoag Memorial Hospital Presbyterian	781	77	9.86	11.18	8.65	6.77-10.81	

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
Orange (continued)	Huntington Beach Hospital	53	1	1.89	6.85	2.70	0.03-15.84	
	Kaiser Foundation Hospital – Anaheim	570	46	8.07	8.50	9.31	6.70-12.46	
	La Palma Intercommunity Hospital	47	1	2.13	6.58	3.17	0.03-18.71	
	Los Alamitos Medical Center	388	61	15.72	10.68	14.44	11.02-18.35	Worse
	Mission Hospital Regional Medical Center	427	43	10.07	12.99	7.60	5.46-10.18	
	Orange Coast Memorial Medical Center	168	16	9.52	7.77	12.03	6.58-19.44	
	Orange County Global Medical Center	185	28	15.14	12.10	12.27	8.14-17.27	
	Placentia Linda Hospital	65	7	10.77	7.42	14.23	5.08-28.97	
	Saddleback Memorial Medical Center	434	58	13.36	13.84	9.47	7.21-12.09	
	Saint Joseph Hospital – Orange	421	43	10.21	11.82	8.48	6.10-11.31	
	Saint Jude Medical Center	486	54	11.11	14.05	7.76	5.82-10.01	

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
Orange (continued)	UC Irvine Medical Center	384	48	12.50	12.12	10.12	7.55-13.09	
	West Anaheim Medical Center	118	9	7.63	7.68	9.74	4.03-18.57	
Placer	Kaiser Foundation Hospital – Roseville	462	56	12.12	11.62	10.23	7.66-13.23	
	Sutter Auburn Faith Hospital	133	14	10.53	8.33	12.40	6.40-20.75	
	Sutter Roseville Medical Center	459	37	8.06	10.23	7.73	5.30-10.72	
Riverside	Corona Regional Medical Center – Main	105	3	2.86	6.87	4.08	0.62-12.42	
	Desert Regional Medical Center	555	78	14.05	9.05	15.23	12.06-18.83	Worse
	Eisenhower Medical Center	759	68	8.96	9.84	8.93	6.82-11.38	
	Hemet Valley Medical Center	201	26	12.94	9.69	13.09	8.52-18.80	
	John F. Kennedy Memorial Hospital	98	14	14.29	7.28	19.25	10.08-31.59	Worse
	Kaiser Foundation Hospital – Moreno Valley	105	13	12.38	7.87	15.44	7.94-25.76	

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
Riverside (continued)	Kaiser Foundation Hospital – Riverside	247	29	11.74	8.60	13.39	8.83-19.03	
	Loma Linda University Medical Center – Murrieta	155	8	5.16	6.85	7.39	2.87-14.89	
	Menifee Valley Medical Center	63	9	14.29	9.58	14.63	6.76-26.29	
	Parkview Community Hospital Medical Center	117	12	10.26	6.34	15.87	7.64-27.62	
	Riverside Community Hospital	499	41	8.22	8.16	9.88	6.97-13.42	
	Riverside County Regional Medical Center	321	27	8.41	8.25	10.00	6.50-14.41	
	San Geronio Memorial Hospital	34	7	20.59	9.62	21.00	7.85-39.36	
	Southwest Healthcare System – Murrieta	332	34	10.24	8.60	11.69	7.99-16.24	
	Temecula Valley Hospital	170	11	6.47	9.06	7.00	3.23-12.70	
Sacramento	Kaiser Foundation Hospital – Sacramento	400	69	17.25	13.78	12.28	9.68-15.19	

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
Sacramento (continued)	Kaiser Foundation Hospital – South Sacramento	414	38	9.18	10.52	8.56	6.00-11.63	
	Mercy General Hospital	311	23	7.40	9.26	7.84	4.78-11.82	
	Mercy Hospital – Folsom	147	9	6.12	8.07	7.44	3.11-14.24	
	Mercy San Juan Hospital	746	91	12.20	10.14	11.80	9.48-14.42	
	Methodist Hospital of Sacramento	369	31	8.40	7.84	10.51	7.01-14.87	
	Sutter General Hospital	384	43	11.20	9.18	11.97	8.61-16.00	
	Sutter Memorial Hospital	133	12	9.02	9.53	9.29	4.49-16.21	
	UC Davis Medical Center	476	40	8.40	8.30	9.94	7.14-13.34	
San Benito	Hazel Hawkins Memorial Hospital	43	4	9.30	7.05	12.94	2.80-32.92	
San Bernardino	Arrowhead Regional Medical Center	336	18	5.36	5.93	8.86	5.04-14.06	
	Barstow Community Hospital	77	7	9.09	5.89	15.14	5.45-30.92	



**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
San Bernardino (continued)	Chino Valley Medical Center	51	4	7.84	8.29	9.28	2.04-23.38	
	Community Hospital of San Bernardino	52	4	7.69	6.32	11.94	3.25-28.61	
	Desert Valley Hospital	195	9	4.62	7.73	5.86	2.43-11.27	
	Kaiser Foundation Hospital – Fontana	510	54	10.59	8.67	11.97	8.97-15.51	
	Loma Linda University Medical Center	527	59	11.20	9.33	11.77	8.96-15.04	
	Redlands Community Hospital	261	32	12.26	11.29	10.65	7.25-14.77	
	Saint Bernadine Medical Center	264	24	9.09	7.64	11.67	7.36-17.18	
	Saint Mary Regional Medical Center	303	19	6.27	7.67	8.02	4.62-12.63	
	San Antonio Community Hospital	466	57	12.23	9.34	12.85	9.72-16.48	
	Victor Valley Global Medical Center	72	3	4.17	4.33	9.43	1.48-28.30	
San Diego	Alvarado Hospital	124	12	9.68	9.24	10.27	5.08-17.62	

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
San Diego (continued)	Grossmont Hospital	834	83	9.95	11.13	8.77	6.99-10.81	
	Kaiser Foundation Hospital – San Diego	474	58	12.24	9.95	12.07	9.10-15.49	
	Palomar Health Downtown Campus	755	86	11.39	10.98	10.17	8.10-12.51	
	Paradise Valley Hospital	86	5	5.81	8.10	7.05	2.24-15.83	
	Pomerado Hospital	153	18	11.76	12.94	8.92	5.20-13.79	
	Scripps Green Hospital	158	10	6.33	12.56	4.95	2.19-9.14	Better
	Scripps Memorial Hospital – Encinitas	310	30	9.68	14.97	6.34	4.21-8.98	Better
	Scripps Memorial Hospital – La Jolla	422	58	13.74	13.40	10.06	7.65-12.85	
	Scripps Mercy Hospital	648	41	6.33	9.15	6.78	4.73-9.30	Better
	Sharp Chula Vista Medical Center	422	32	7.58	9.55	7.79	5.18-11.04	
	Sharp Coronado Hospital and Healthcare Center	36	5	13.89	14.51	9.39	2.90-19.66	

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
San Diego (continued)	Sharp Memorial Hospital	548	52	9.49	9.63	9.67	7.14-12.66	
	Tri-City Medical Center – Oceanside	445	44	9.89	10.87	8.93	6.41-11.93	
	UC San Diego Medical Center	322	28	8.70	10.43	8.18	5.38-11.67	
San Francisco	California Pacific Medical Center – Davies Campus	206	21	10.19	11.77	8.50	5.13-12.83	
	California Pacific Medical Center – Pacific Campus	306	36	11.76	11.54	10.00	6.93-13.69	
	California Pacific Medical Center – St. Luke’s Campus	49	4	8.16	7.82	10.24	2.29-25.06	
	Chinese Hospital	54	3	5.56	6.46	8.44	1.27-25.38	
	Kaiser Foundation Hospital – San Francisco	276	21	7.61	7.15	10.43	6.20-16.09	
	Saint Francis Memorial Hospital	155	16	10.32	11.13	9.10	4.99-14.62	
	Saint Mary’s Medical Center – San Francisco	117	16	13.68	10.68	12.56	6.94-20.03	

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
San Francisco (continued)	San Francisco General Hospital	243	23	9.47	8.26	11.24	7.20-16.42	
	UC San Francisco Medical Center	311	38	12.22	11.16	10.74	7.57-14.56	
San Joaquin	Dameron Hospital	164	17	10.37	9.31	10.92	6.09-17.34	
	Doctors Hospital of Manteca	90	9	10.00	7.00	14.02	5.76-26.70	
	Kaiser Foundation Hospital – Manteca	122	18	14.75	12.65	11.45	6.76-17.41	
	Lodi Memorial Hospital	141	23	16.31	11.18	14.31	8.99-20.90	
	Saint Joseph's Medical Center of Stockton	356	23	6.46	7.26	8.74	5.32-13.27	
	San Joaquin General Hospital	139	18	12.95	4.27	29.72	17.42-45.82	Worse
	Sutter Tracy Community Hospital	87	5	5.75	7.92	7.12	1.96-16.59	
San Luis Obispo	French Hospital Medical Center	90	11	12.22	11.76	10.20	4.83-17.84	
	Marian Regional Medical Center – Arroyo Grande	98	11	11.22	8.41	13.10	6.16-23.17	

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
San Luis Obispo (continued)	Sierra Vista Regional Medical Center	120	19	15.83	8.69	17.88	10.47-27.35	Worse
	Twin Cities Community Hospital	167	23	13.77	8.44	16.01	9.83-23.87	Worse
San Mateo	Kaiser Foundation Hospital – Redwood City	316	44	13.92	12.90	10.59	7.66-14.05	
	Kaiser Foundation Hospital – South San Francisco	177	21	11.86	10.21	11.40	6.86-17.15	
	Mills-Peninsula Medical Center	330	31	9.39	14.21	6.48	4.31-9.16	Better
	San Mateo Medical Center	48	1	2.08	3.89	5.25	0.05-29.60	
	Sequoia Hospital	98	12	12.24	10.14	11.85	5.73-20.40	
	Seton Medical Center	232	21	9.05	11.06	8.03	4.86-12.16	
Santa Barbara	Lompoc Valley Medical Center	45	2	4.44	10.49	4.16	0.32-15.14	
	Marian Regional Medical Center	245	30	12.24	11.06	10.86	7.28-15.25	
	Santa Barbara Cottage Hospital	476	66	13.87	11.82	11.51	8.90-14.50	

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
Santa Clara	El Camino Hospital	390	50	12.82	11.79	10.66	7.91-13.89	
	Good Samaritan Hospital – San Jose	431	43	9.98	9.53	10.28	7.32-13.85	
	Kaiser Foundation Hospital – San Jose	315	27	8.57	10.69	7.87	5.10-11.32	
	Kaiser Foundation Hospital – Santa Clara	333	52	15.62	13.27	11.55	8.70-14.81	
	O'Connor Hospital	203	18	8.87	10.79	8.06	4.68-12.60	
	Regional Medical of San Jose	453	54	11.92	9.99	11.71	8.81-15.06	
	Saint Louise Regional Hospital	76	8	10.53	7.09	14.57	5.84-28.06	
	Santa Clara Valley Medical Center	356	20	5.62	4.67	11.81	6.87-18.48	
	Stanford Hospital	317	39	12.30	12.33	9.79	6.95-13.19	
Santa Cruz	Dominican Hospital – Santa Cruz/Soquel	295	31	10.51	10.65	9.68	6.51-13.64	
	Watsonville Community Hospital	78	12	15.38	8.76	17.24	8.50-29.15	

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
Shasta	Mercy Medical Center – Redding	327	45	13.76	11.72	11.52	8.41-15.16	
	Shasta Regional Medical Center	245	19	7.76	8.04	9.46	5.37-15.02	
Siskiyou	Fairchild Medical Center	51	9	17.65	10.23	16.92	7.58-30.20	
Solano	Kaiser Foundation Hospital – Rehabilitation Center Vallejo	310	21	6.77	10.52	6.32	3.80-9.60	Better
	Kaiser Foundation Hospital – Vacaville	230	17	7.39	11.11	6.53	3.71-10.26	
	North Bay Medical Center	238	29	12.18	10.55	11.33	7.65-15.79	
	Sutter Solano Medical Center	113	8	7.08	6.54	10.63	4.12-20.90	
Sonoma	Kaiser Foundation Hospital – Santa Rosa	250	35	14.00	12.59	10.91	7.69-14.79	
	Petaluma Valley Hospital	71	5	7.04	7.96	8.68	2.36-20.31	
	Santa Rosa Memorial Hospital – Montgomery	323	49	15.17	11.66	12.77	9.45-16.61	
	Sonoma Valley Hospital	40	2	5.00	13.02	3.77	0.29-13.55	

**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
Sonoma (continued)	Sutter Medical Center of Santa Rosa	50	3	6.00	7.88	7.47	1.49-20.84	
	Sutter Santa Rosa Regional Hospital	54	5	9.26	10.69	8.50	2.56-19.13	
Stanislaus	Doctors Medical Center	532	46	8.65	7.73	10.97	7.87-14.70	
	Emanuel Medical Center, Inc.	134	16	11.94	10.90	10.74	6.11-16.90	
	Memorial Hospital Medical Center – Modesto	496	42	8.47	9.86	8.42	5.95-11.44	
Tehama	Saint Elizabeth Community Hospital	83	10	12.05	10.79	10.95	5.05-19.52	
Tulare	Kaweah Delta Medical Center	537	54	10.06	8.75	11.27	8.43-14.63	
	Sierra View District Hospital	177	13	7.34	7.90	9.12	4.55-15.76	
Tuolumne	Sonora Regional Medical Center – Greenley	131	22	16.79	12.01	13.71	8.62-20.05	
Ventura	Community Memorial Hospital – San Buenaventura	291	32	11.00	11.80	9.14	6.15-12.80	
	Los Robles Hospital and Medical Center	300	23	7.67	9.87	7.62	4.61-11.58	



**Table 8. Hospital Risk-Adjusted 30-Day Mortality Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Deaths	Observed Mortality Rate (%)	Expected Mortality Rate (%)	Risk-Adjusted Mortality Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		65,789	6,454	9.81				
Ventura (continued)	Ojai Valley Community Hospital	32	3	9.38	15.85	5.80	0.89-16.48	
	Saint John's Pleasant Valley Hospital	119	11	9.24	9.69	9.36	4.32-16.75	
	Saint John's Regional Medical Center	214	18	8.41	8.22	10.04	5.79-15.79	
	Simi Valley Hospital and Healthcare Services – Sycamore	165	15	9.09	10.38	8.60	4.69-13.98	
	Ventura County Medical Center	116	8	6.90	8.79	7.70	3.16-14.89	
Yolo	Sutter Davis Hospital	62	8	12.90	14.14	8.96	3.65-16.89	
	Woodland Memorial Hospital	79	13	16.46	10.64	15.18	8.04-24.79	
Yuba	Rideout Memorial Hospital	302	32	10.60	7.90	13.16	8.91-18.45	

\* A Hospital is classified as “Better” if the upper 98% Confidence Interval (CI) of the risk-adjusted rate falls below the California observed rate 9.81% for RAMR. A hospital is classified as “Worse” if the lower 98% CI of the risk-adjusted rate is higher than the California observed rate. A hospital's performance is classified as “As Expected” (rating is blank) if the California observed rate falls within the 98% CI of the hospital risk-adjusted rate.

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Alameda	Alameda Hospital	86	15	17.44	12.41	16.59	8.70-27.28	
	Alta Bates Summit Medical Center	468	56	11.97	13.41	10.53	7.69-13.93	
	Alta Bates Summit Medical Center – Alta Bates Campus	288	27	9.38	11.71	9.45	5.86-14.17	
	Eden Medical Center	410	58	14.15	12.44	13.42	9.90-17.57	
	Highland Hospital	172	24	13.95	10.86	15.16	9.18-22.98	
	Kaiser Foundation Hospital – Fremont	71	7	9.86	12.30	9.45	3.25-20.13	
	Kaiser Foundation Hospital – Hayward	77	10	12.99	12.48	12.28	5.27-22.94	
	Kaiser Foundation Hospital – Oakland Campus	130	23	17.69	14.27	14.63	8.87-21.95	
	Kaiser Foundation Hospital – Oakland/Richmond	417	61	14.63	14.06	12.27	9.13-15.95	
	Kaiser Foundation Hospital – San Leandro	140	15	10.71	13.07	9.67	4.97-16.40	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Alameda (continued)	Saint Rose Hospital	84	11	13.10	11.21	13.78	6.22-25.06	
	San Leandro Hospital	50	4	8.00	13.10	7.20	1.53-19.02	
	Valleycare Medical Center	95	7	7.37	10.86	8.00	2.73-17.32	
	Washington Hospital – Fremont	299	36	12.04	11.80	12.04	8.06-17.01	
Amador	Sutter Amador Hospital	119	19	15.97	10.41	18.09	10.22-28.57	
Butte	Enloe Medical Center – Esplanade	374	38	10.16	10.38	11.54	7.78-16.27	
	Feather River Hospital	107	12	11.22	11.35	11.66	5.44-20.94	
	Oroville Hospital	238	45	18.91	12.66	17.62	12.51-23.66	Worse
Calaveras	Mark Twain Medical Center	37	2	5.41	10.35	6.16	0.46-23.59	
Contra Costa	Contra Costa Regional Medical Center	113	14	12.39	11.73	12.46	6.25-21.36	
	Doctors Medical Center – San Pablo	95	13	13.68	12.36	13.06	6.38-22.63	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Contra Costa (continued)	John Muir Medical Center – Concord Campus	290	24	8.28	12.51	7.80	4.67-12.02	
	John Muir Medical Center – Walnut Creek Campus	416	46	11.06	11.66	11.19	7.86-15.26	
	Kaiser Foundation Hospital – Antioch	250	33	13.20	13.10	11.89	7.82-16.99	
	Kaiser Foundation Hospital – Walnut Creek	316	36	11.39	12.54	10.72	7.17-15.17	
	San Ramon Regional Medical Center	185	20	10.81	12.09	10.55	6.00-16.73	
	Sutter Delta Medical Center	125	13	10.40	13.77	8.91	4.32-15.63	
Del Norte	Sutter Coast Hospital	77	4	5.19	12.15	5.04	1.06-13.80	
El Dorado	Marshall Medical Center	152	14	9.21	10.72	10.14	5.03-17.66	
Fresno	Adventist Medical Center – Reedley	30	3	10.00	9.30	12.69	1.90-37.60	
	Clovis Community Medical Center	291	28	9.62	11.48	9.89	6.19-14.73	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Fresno (continued)	Community Regional Medical Center – Fresno	706	95	13.46	11.84	13.41	10.61-16.61	
	Kaiser Foundation Hospital – Fresno	274	26	9.49	12.46	8.98	5.51-13.56	
	Saint Agnes Medical Center	587	71	12.10	12.28	11.61	8.81-14.90	
Humboldt	Mad River Community Hospital	48	8	16.67	9.72	20.24	7.72-39.64	
	Saint Joseph Hospital – Eureka	165	12	7.27	11.98	7.16	3.31-13.10	
Imperial	El Centro Regional Medical Center	183	19	10.38	12.46	9.83	5.49-15.81	
	Pioneers Memorial Healthcare District	140	23	16.43	11.78	16.45	9.90-24.89	
Kern	Bakersfield Heart Hospital	66	9	13.64	12.05	13.35	5.44-25.59	
	Bakersfield Memorial Hospital	310	28	9.03	11.02	9.67	6.05-14.42	
	Kern Medical Center	45	4	8.89	12.15	8.63	1.83-22.70	
	Mercy Hospital – Bakersfield	179	18	10.06	10.53	11.27	6.18-18.37	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Kern (continued)	Ridgecrest Regional Hospital	36	2	5.56	9.62	6.81	0.51-26.00	
	San Joaquin Community Hospital	482	53	11.00	11.65	11.13	8.04-14.87	
Kings	Adventist Medical Center	245	24	9.80	11.29	10.23	6.15-15.68	
Lake	Sutter Lakeside Hospital	43	3	6.98	10.90	7.55	1.12-23.11	
Los Angeles	Alhambra Hospital Medical Center	94	17	18.09	12.14	17.57	9.67-28.05	
	Antelope Valley Hospital	386	62	16.06	11.44	16.56	12.37-21.45	Worse
	Beverly Hospital	115	12	10.43	12.56	9.80	4.58-17.60	
	California Hospital Medical Center – Los Angeles	318	46	14.47	11.64	14.66	10.37-19.84	
	Cedars Sinai Medical Center	678	92	13.57	12.77	12.54	9.88-15.57	
	Centinela Hospital Medical Center	381	75	19.69	15.12	15.36	11.90-19.29	Worse
	Citrus Valley Medical Center – Inter Community Campus	102	14	13.73	11.29	14.34	7.22-24.42	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Los Angeles (continued)	Citrus Valley Medical Center – Queen of the Valley Campus	320	39	12.19	11.07	12.99	8.85-18.13	
	College Medical Center	31	2	6.45	13.67	5.57	0.42-20.69	
	Community Hospital Long Beach	49	2	4.08	13.17	3.66	0.28-14.10	
	Foothill Presbyterian Hospital – Johnston Memorial	94	8	8.51	10.54	9.52	3.55-19.57	
	Garfield Medical Center	267	48	17.98	12.42	17.07	12.26-22.76	Worse
	Glendale Adventist Medical Center – Wilson Terrace	347	44	12.68	12.68	11.80	8.25-16.12	
	Glendale Memorial Hospital and Medical Center	129	19	14.73	12.25	14.19	8.02-22.43	
	Good Samaritan Hospital – Los Angeles	181	28	15.47	11.97	15.25	9.69-22.28	
	Henry Mayo Newhall Hospital	218	31	14.22	11.25	14.92	9.68-21.52	
	Hollywood Presbyterian Medical Center	218	30	13.76	11.51	14.11	9.07-20.48	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Los Angeles (continued)	Huntington Memorial Hospital	474	62	13.08	12.05	12.81	9.53-16.67	
	Kaiser Foundation Hospital – Baldwin Park	365	49	13.42	12.56	12.61	9.02-16.92	
	Kaiser Foundation Hospital – Downey	464	52	11.21	11.82	11.18	8.05-14.97	
	Kaiser Foundation Hospital – Panorama City	178	10	5.62	12.38	5.35	2.25-10.40	Better
	Kaiser Foundation Hospital – South Bay	259	43	16.60	13.08	14.97	10.50-20.33	
	Kaiser Foundation Hospital – Sunset	372	42	11.29	12.73	10.46	7.24-14.42	
	Kaiser Foundation Hospital – West Los Angeles	483	58	12.01	12.86	11.02	8.10-14.50	
	Kaiser Foundation Hospital – Woodland Hills	323	29	8.98	12.73	8.32	5.26-12.31	
	Lakewood Regional Medical Center	267	38	14.23	12.35	13.59	9.25-18.94	
	Long Beach Memorial Medical Center	596	76	12.75	12.54	12.00	9.21-15.24	



**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Los Angeles (continued)	Los Angeles County/Harbor – UCLA Medical Center	204	23	11.27	10.79	12.32	7.34-18.96	
	Los Angeles County/Olive View – UCLA Medical Center	109	13	11.93	10.78	13.05	6.32-22.89	
	Los Angeles County/University of Southern California Medical Center	188	24	12.77	11.58	13.00	7.87-19.73	
	Marina Del Rey Hospital	68	10	14.71	13.06	13.28	5.78-24.40	
	Memorial Hospital of Gardena	97	17	17.53	14.86	13.91	7.65-22.21	
	Methodist Hospital of Southern California	457	66	14.44	12.76	13.35	10.06-17.18	
	Mission Community Hospital – Panorama Campus	39	4	10.26	12.59	9.61	2.05-25.03	
	Monterey Park Hospital	58	8	13.79	12.24	13.29	5.05-26.36	
	Northridge Hospital Medical Center	244	30	12.30	11.86	12.23	7.85-17.83	
	Olympia Medical Center	53	10	18.87	13.90	16.01	7.00-28.98	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Los Angeles (continued)	Pacific Alliance Medical Center, Inc.	102	9	8.82	12.80	8.13	3.26-16.01	
	Palmdale Regional Medical Center	162	21	12.96	11.35	13.47	7.83-20.99	
	PIH Hospital - Downey	156	16	10.26	12.04	10.05	5.31-16.77	
	Pomona Valley Hospital Medical Center	526	71	13.50	11.42	13.94	10.59-17.83	
	Presbyterian Intercommunity Hospital	548	72	13.14	12.25	12.65	9.64-16.17	
	Providence Holy Cross Medical Center	293	45	15.36	12.02	15.08	10.65-20.40	
	Providence Little Company of Mary Medical Center – San Pedro	145	24	16.55	11.35	17.20	10.49-25.78	
	Providence Little Company of Mary Medical Center – Torrance	547	77	14.08	12.44	13.35	10.28-16.90	
	Providence Saint John's Health Center	145	16	11.03	11.79	11.04	5.82-18.42	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Los Angeles (continued)	Providence Saint Joseph Medical Center	501	53	10.58	11.52	10.83	7.82-14.47	
	Providence Tarzana Medical Center	228	25	10.96	12.23	10.58	6.45-16.01	
	Ronald Reagan UCLA Medical Center	432	56	12.96	12.51	12.22	8.94-16.13	
	Saint Francis Medical Center	304	38	12.50	13.37	11.03	7.52-15.37	
	Saint Mary Medical Center -- Long Beach	192	32	16.67	14.11	13.93	9.19-19.79	
	Saint Vincent Medical Center	133	19	14.29	11.97	14.08	7.95-22.31	
	San Dimas Community Hospital	49	6	12.24	12.36	11.69	3.65-25.57	
	San Gabriel Valley Medical Center	144	21	14.58	13.33	12.90	7.54-19.97	
	Santa Monica – UCLA Medical Center and Orthopedic Hospital	182	23	12.64	11.43	13.04	7.78-19.99	
	Sherman Oaks Hospital	68	10	14.71	11.69	14.84	6.42-27.44	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Los Angeles (continued)	Southern California Hospital At Culver City	109	22	20.18	13.07	18.21	10.95-27.40	
	Torrance Memorial Medical Center	544	80	14.71	11.19	15.51	12.01-19.53	Worse
	University of Southern California Verdugo Hills Hospital	99	13	13.13	10.40	14.89	7.23-25.98	
	Valley Presbyterian Hospital	175	30	17.14	12.33	16.39	10.64-23.54	
	West Hills Hospital and Medical Center	199	26	13.07	10.39	14.83	9.17-22.17	
	White Memorial Medical Center	278	49	17.63	13.53	15.36	11.08-20.42	
	Whittier Hospital Medical Center	92	12	13.04	11.36	13.55	6.36-24.08	
Madera	Madera Community Hospital	54	7	12.96	12.25	12.48	4.33-25.98	
Marin	Kaiser Foundation Hospital – San Rafael	145	10	6.90	11.53	7.05	2.98-13.62	
	Marin General Hospital	221	14	6.33	10.54	7.09	3.49-12.51	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Marin (continued)	Novato Community Hospital	53	6	11.32	10.66	12.52	3.87-27.80	
Mendocino	Frank R. Howard Memorial Hospital	33	3	9.09	11.14	9.62	1.45-28.57	
	Mendocino Coast District Hospital	30	4	13.33	9.13	17.23	3.70-43.72	
	Ukiah Valley Medical Center	83	4	4.82	11.28	5.04	1.05-13.86	
Merced	Mercy Medical Center – Merced	237	29	12.24	11.95	12.08	7.69-17.72	
Monterey	Community Hospital Monterey Peninsula	311	28	9.00	11.05	9.62	6.02-14.33	
	Natividad Medical Center	45	4	8.89	9.76	10.74	2.27-28.48	
	Salinas Valley Memorial Hospital	298	31	10.40	11.70	10.48	6.75-15.28	
Napa	Queen of the Valley Hospital	169	19	11.24	11.83	11.21	6.28-17.96	
	Saint Helena Hospital	31	4	12.90	11.43	13.32	2.85-33.92	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Nevada	Sierra Nevada Memorial Hospital	146	13	8.90	10.22	10.28	4.93-18.30	
Orange	AHMC Anaheim Regional Medical Center	173	27	15.61	11.34	16.23	10.23-23.83	
	Fountain Valley Regional Hospital and Medical Center – Euclid	393	41	10.43	12.17	10.11	6.94-14.06	
	Garden Grove Hospital and Medical Center	65	7	10.77	14.28	8.89	3.08-18.69	
	Hoag Memorial Hospital Presbyterian	760	94	12.37	11.05	13.20	10.41-16.40	
	Huntington Beach Hospital	53	5	9.43	11.55	9.64	2.55-23.16	
	Kaiser Foundation Hospital – Orange County – Anaheim	553	57	10.31	12.10	10.05	7.35-13.30	
	La Palma Intercommunity Hospital	46	6	13.04	11.59	13.27	4.13-29.00	
	Los Alamitos Medical Center	376	35	9.31	11.61	9.46	6.26-13.54	
	Mission Hospital Regional Medical Center	402	34	8.46	11.45	8.71	5.72-12.56	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Orange (continued)	Orange Coast Memorial Medical Center	166	31	18.67	11.54	19.09	12.51-27.17	Worse
	Orange County Global Medical Center	169	20	11.83	11.10	12.57	7.17-19.91	
	Placentia Linda Hospital	62	5	8.06	9.61	9.89	2.60-24.12	
	Saddleback Memorial Medical Center	416	34	8.17	11.44	8.43	5.53-12.16	
	Saint Joseph Hospital – Orange	403	54	13.40	11.29	14.00	10.19-18.55	
	Saint Jude Medical Center	458	54	11.79	12.57	11.06	8.03-14.70	
	UC Irvine Medical Center	351	44	12.54	11.93	12.39	8.66-16.95	
	West Anaheim Medical Center	115	11	9.57	12.83	8.80	3.93-16.25	
Placer	Kaiser Foundation Hospital – Roseville	439	40	9.11	12.30	8.74	5.95-12.23	
	Sutter Auburn Faith Hospital	129	9	6.98	9.95	8.27	3.29-16.54	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Placer (continued)	Sutter Roseville Medical Center	439	42	9.57	11.69	9.65	6.64-13.39	
Riverside	Corona Regional Medical Center – Main	104	18	17.31	12.33	16.55	9.26-26.18	
	Desert Regional Medical Center	517	56	10.83	10.89	11.74	8.55-15.58	
	Eisenhower Medical Center	736	84	11.41	10.51	12.81	9.94-16.15	
	Hemet Valley Medical Center	189	26	13.76	11.85	13.69	8.51-20.34	
	John F. Kennedy Memorial Hospital	92	8	8.70	11.65	8.81	3.29-18.05	
	Kaiser Foundation Hospital – Moreno Valley	102	15	14.71	12.20	14.21	7.39-23.66	
	Kaiser Foundation Hospital – Riverside	233	26	11.16	12.01	10.96	6.76-16.46	
	Loma Linda University Medical Center – Murrieta	152	15	9.87	9.96	11.69	5.98-19.94	



**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Riverside (continued)	Menifee Valley Medical Center	58	4	6.90	10.92	7.45	1.57-20.03	
	Parkview Community Hospital Medical Center	112	18	16.07	11.83	16.03	8.96-25.47	
	Riverside Community Hospital	482	55	11.41	11.49	11.71	8.53-15.54	
	Riverside County Regional Medical Center	303	36	11.88	11.48	12.21	8.17-17.28	
	San Geronio Memorial Hospital	33	4	12.12	11.09	12.90	2.76-32.98	
	Southwest Healthcare System – Murrieta	318	35	11.01	10.78	12.04	7.99-17.16	
	Temecula Valley Hospital	164	20	12.20	10.35	13.90	7.92-22.01	
Sacramento	Kaiser Foundation Hospital – Sacramento	367	41	11.17	12.72	10.36	7.12-14.37	
	Kaiser Foundation Hospital – South Sacramento	396	44	11.11	13.44	9.76	6.80-13.38	
	Mercy General Hospital	301	35	11.63	11.94	11.49	7.64-16.33	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Sacramento (continued)	Mercy Hospital of Folsom	143	13	9.09	10.35	10.37	4.99-18.39	
	Mercy San Juan Hospital	690	83	12.03	10.94	12.98	10.06-16.36	
	Methodist Hospital of Sacramento	357	49	13.73	12.44	13.02	9.30-17.50	
	Sutter Medical Center – Sacramento	366	20	5.46	11.35	5.68	3.19-9.20	Better
	Sutter Memorial Hospital	128	16	12.50	12.10	12.19	6.45-20.20	
	UC Davis Medical Center	449	50	11.14	11.55	11.37	8.13-15.31	
San Benito	Hazel Hawkins Memorial Hospital	42	5	11.90	9.96	14.10	3.75-33.31	
San Bernardino	Arrowhead Regional Medical Center	326	38	11.66	10.82	12.71	8.59-17.84	
	Barstow Community Hospital	75	9	12.00	12.15	11.65	4.72-22.55	
	Chino Valley Medical Center	50	5	10.00	12.73	9.26	2.46-22.13	
	Community Hospital of San Bernardino	49	9	18.37	10.57	20.50	8.45-38.33	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
San Bernardino (continued)	Desert Valley Hospital	195	31	15.90	15.11	12.41	8.12-17.73	
	Kaiser Foundation Hospital – Fontana	482	47	9.75	12.41	9.27	6.53-12.62	
	Loma Linda University Medical Center	482	55	11.41	11.35	11.86	8.62-15.75	
	Redlands Community Hospital	256	22	8.59	12.28	8.26	4.82-12.93	
	Saint Bernadine Medical Center	255	31	12.16	11.18	12.82	8.28-18.62	
	Saint Mary Regional Medical Center	296	31	10.47	12.23	10.10	6.51-14.70	
	San Antonio Community Hospital	441	54	12.24	11.00	13.13	9.53-17.45	
	Victor Valley Global Medical Center	71	13	18.31	12.07	17.90	8.85-30.39	
San Diego	Alvarado Hospital	119	19	15.97	13.95	13.50	7.72-21.09	
	Grossmont Hospital	789	108	13.69	12.09	13.36	10.73-16.33	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
San Diego (continued)	Kaiser Foundation Hospital – San Diego	447	42	9.40	11.81	9.38	6.46-13.03	
	Palomar Heath Downtown Campus	707	72	10.18	10.39	11.56	8.75-14.87	
	Paradise Valley Hospital	84	14	16.67	13.76	14.29	7.26-23.97	
	Pomerado Hospital	144	10	6.94	10.28	7.97	3.36-15.42	
	Scripps Green Hospital	155	19	12.26	11.78	12.28	6.89-19.62	
	Scripps Memorial Hospital – Encinitas	298	31	10.40	11.67	10.51	6.77-15.33	
	Scripps Memorial Hospital – La Jolla	384	49	12.76	11.21	13.43	9.58-18.09	
	Scripps Mercy Hospital	622	71	11.41	11.68	11.53	8.73-14.83	
	Sharp Chula Vista Medical Center	407	61	14.99	12.56	14.08	10.47-18.31	
	Sharp Coronado Hospital and Healthcare Center	34	3	8.82	12.13	8.58	1.29-25.38	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
San Diego (continued)	Sharp Memorial Hospital	510	62	12.16	11.36	12.63	9.38-16.47	
	Tri-City Medical Center – Oceanside	426	53	12.44	11.19	13.12	9.49-17.47	
	UC San Diego Medical Center	309	42	13.59	10.99	14.58	10.11-20.06	
San Francisco	California Pacific Medical Center – Davies Campus	190	20	10.53	11.51	10.78	6.13-17.14	
	California Pacific Medical Center – Pacific Campus	286	38	13.29	12.48	12.56	8.52-17.54	
	California Pacific Medical Center – St. Luke’s Campus	48	7	14.58	13.73	12.53	4.39-25.67	
	Chinese Hospital	54	8	14.81	11.24	15.55	5.91-30.72	
	Kaiser Foundation Hospital – San Francisco	269	34	12.64	11.55	12.91	8.53-18.42	
	Saint Francis Memorial Hospital	145	25	17.24	11.77	17.28	10.70-25.63	
	Saint Mary’s Medical Center, San Francisco	109	11	10.09	11.70	10.18	4.54-18.85	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
San Francisco (continued)	San Francisco General Hospital	226	24	10.62	11.64	10.76	6.48-16.45	
	UC San Francisco Medical Center	288	32	11.11	11.14	11.77	7.64-17.04	
San Joaquin	Dameron Hospital	157	15	9.55	12.45	9.06	4.63-15.45	
	Doctors Hospital of Manteca	88	12	13.64	11.30	14.24	6.70-25.24	
	Kaiser Foundation Hospital – Manteca	112	15	13.39	14.20	11.13	5.76-18.63	
	Lodi Memorial Hospital	132	12	9.09	10.55	10.17	4.72-18.45	
	Saint Joseph’s Medical Center of Stockton	349	47	13.47	11.35	14.00	9.93-18.91	
	San Joaquin General Hospital	132	8	6.06	10.70	6.68	2.47-13.96	
	Sutter Tracy Community Hospital	84	13	15.48	12.37	14.75	7.23-25.40	
San Luis Obispo	French Hospital Medical Center	85	7	8.24	11.64	8.35	2.86-17.88	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
San Luis Obispo (continued)	Marian Regional Medical Center – Arroyo Grande	95	8	8.42	9.81	10.13	3.77-20.86	
	Sierra Vista Regional Medical Center	114	15	13.16	9.80	15.84	8.17-26.66	
	Twin Cities Community Hospital	160	19	11.88	10.06	13.93	7.80-22.33	
San Mateo	Kaiser Foundation Hospital – Redwood City	288	38	13.19	12.55	12.40	8.43-17.32	
	Kaiser Foundation Hospital – South San Francisco	166	26	15.66	12.52	14.76	9.19-21.84	
	Mills-Peninsula Medical Center	319	34	10.66	12.40	10.14	6.68-14.52	
	San Mateo Medical Center	47	2	4.26	9.45	5.31	0.40-20.76	
	Sequoia Hospital	92	11	11.96	10.37	13.60	6.10-24.95	
	Seton Medical Center	224	25	11.16	12.00	10.97	6.69-16.60	
Santa Barbara	Lompoc Valley Medical Center	44	6	13.64	10.85	14.83	4.60-32.39	
	Marian Region Medical Center	228	17	7.46	11.25	7.82	4.18-13.04	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Santa Barbara (continued)	Santa Barbara Cottage Hospital	442	34	7.69	10.62	8.55	5.59-12.35	
Santa Clara	El Camino Hospital	358	39	10.89	10.55	12.18	8.27-17.06	
	Good Samaritan Hospital – San Jose	407	40	9.83	10.39	11.15	7.60-15.60	
	Kaiser Foundation Hospital – San Jose	304	34	11.18	12.59	10.48	6.92-14.98	
	Kaiser Foundation Hospital – Santa Clara	306	38	12.42	13.29	11.02	7.48-15.43	
	O'Connor Hospital	194	14	7.22	11.14	7.64	3.78-13.41	
	Regional Medical of San Jose	416	56	13.46	11.53	13.77	10.08-18.17	
	Saint Louise Regional Hospital	72	6	8.33	10.02	9.81	3.00-22.31	
	Santa Clara Valley Medical Center	343	47	13.70	10.93	14.79	10.48-20.01	
	Stanford Hospital	303	23	7.59	10.87	8.24	4.86-12.83	



**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Santa Cruz	Dominican Hospital	284	25	8.80	10.32	10.06	6.10-15.37	
	Watsonville Community Hospital	76	9	11.84	11.26	12.41	5.03-24.01	
Shasta	Mercy Medical Center – Redding	303	31	10.23	11.74	10.28	6.63-14.96	
	Shasta Regional Medical Center	234	15	6.41	11.09	6.82	3.46-11.80	
Siskiyou	Fairchild Medical Center	49	1	2.04	10.10	2.38	0.02-14.86	
Solano	Kaiser Foundation Hospital – Rehabilitation Center Vallejo	304	43	14.14	13.56	12.30	8.58-16.82	
	Kaiser Foundation Hospital – Vacaville	216	18	8.33	12.26	8.02	4.38-13.15	
	North Bay Medical Center	223	22	9.87	12.68	9.18	5.38-14.30	
	Sutter Solano Medical Center	110	16	14.55	12.65	13.57	7.23-22.26	
Sonoma	Kaiser Foundation Hospital – Santa Rosa	230	14	6.09	11.45	6.27	3.09-11.08	Better

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Sonoma (continued)	Petaluma Valley Hospital	70	8	11.43	10.63	12.68	4.77-25.57	
	Santa Rosa Memorial Hospital – Montgomery	296	22	7.43	11.30	7.76	4.52-12.21	
	Sonoma Valley Hospital	39	2	5.13	10.04	6.02	0.45-23.24	
	Sutter Medical Center of Santa Rosa	48	6	12.50	10.47	14.08	4.37-30.93	
	Sutter Santa Rosa Regional Hospital	52	1	1.92	11.16	2.03	0.02-12.64	
Stanislaus	Doctors Medical Center	513	71	13.84	10.90	14.98	11.38-19.18	
	Emanuel Medical Center, Inc.	128	12	9.38	11.39	9.71	4.51-17.58	
	Memorial Hospital Medical Center – Modesto	487	69	14.17	12.17	13.73	10.40-17.62	
Tehama	Saint Elizabeth Community Hospital	81	11	13.58	10.84	14.77	6.66-26.87	
Tulare	Kaweah Delta Medical Center	504	47	9.33	11.28	9.75	6.86-13.31	
	Sierra View District Hospital	171	24	14.04	12.13	13.65	8.29-20.61	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
<b>Statewide</b>		62,681	7,394	11.80				
Tuolumne	Sonora Regional Medical Center – Greenley	122	12	9.84	11.67	9.95	4.63-17.97	
Ventura	Community Memorial Hospital – San Buenaventura	280	22	7.86	10.99	8.43	4.92-13.25	
	Los Robles Hospital and Medical Center	290	44	15.17	10.99	16.28	11.43-22.14	
	Ojai Valley Community Hospital	31	1	3.23	10.84	3.51	0.04-21.15	
	Saint John’s Pleasant Valley Hospital	115	13	11.30	10.53	12.67	6.12-22.29	
	Saint John’s Regional Medical Center	202	25	12.38	11.48	12.72	7.77-19.20	
	Simi Valley Hospital and Healthcare Services – Sycamore	155	19	12.26	12.32	11.74	6.60-18.72	
	Ventura County Medical Center	110	13	11.82	11.37	12.26	5.94-21.49	
Yolo	Sutter Davis Hospital	61	9	14.75	14.34	12.14	4.98-23.03	
	Woodland Memorial Hospital	74	3	4.05	10.50	4.55	0.67-14.48	

**Table 9. Hospital Risk-Adjusted 30-Day Readmission Results by County, 2014-2015**

County	Hospital	Ischemic Stroke Cases	Ischemic Stroke Readmissions	Observed Readmission Rate (%)	Expected Readmission Rate (%)	Risk-Adjusted Readmission Rate (% RAMR)	98% CI for RAMR	Performance Rating*
Statewide		62,681	7,394	11.80				
Yuba	Rideout Memorial Hospital	281	28	9.96	11.58	10.15	6.37-15.08	

\*A Hospital is classified as “Better” if the upper 98% Confidence Interval (CI) of the risk-adjusted rate falls below the California observed rate (11.80% for RARR). A hospital is classified as “Worse” if the lower 98% CI of the risk-adjusted rate is higher than the California observed rate. A hospital’s performance is classified as “As Expected” (rating is blank) if the California observed rate falls within the 98% CI of the hospital risk-adjusted rate.